SR 101 Corridor Improvement Feasibility Study

screening of preliminary alternatives

prepared for

Indiana Department of Transportation

prepared by

Cambridge Systematics, Inc.

with

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Dyer Environmental Services

Revised: March 2002 (v.2)

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1.0 Introduction

The SR 101 Corridor Improvement Feasibility Study has been undertaken by the Indiana Department of Transportation to assess the implications of limited north-south access in the SR 101 study area and to identify feasible improvement alternatives. Based on an assessment of purpose and need, discussed in the draft Statement of Purpose and Need (January 2002), study goals include the following:

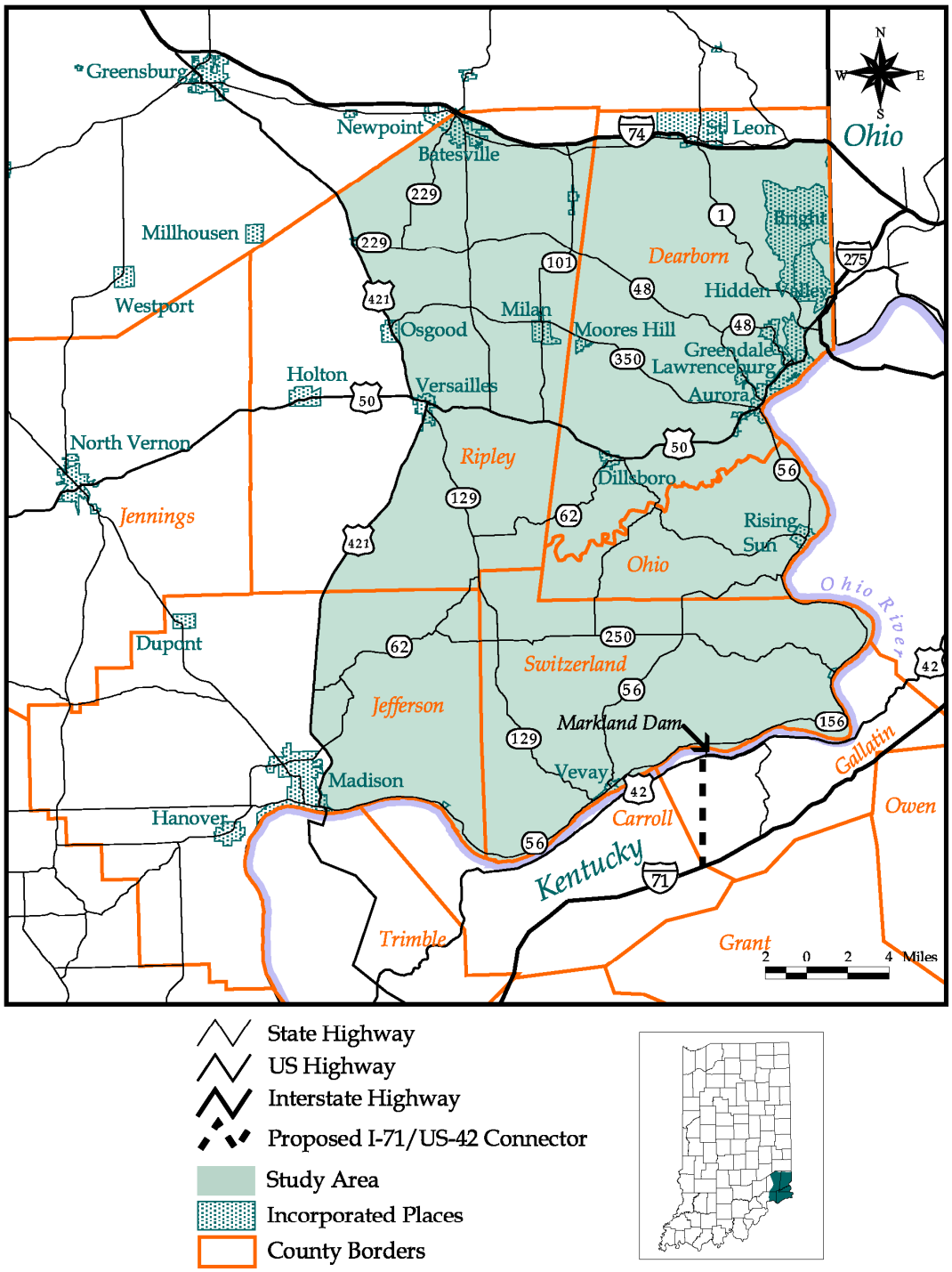
- Improve roadway safety and reduce accident frequency in the study area; and
- Address perceptions of inadequate regional accessibility and connectivity, and if perceptions prove valid, improve regional accessibility and connectivity.

The existing Indiana State Route 101 (SR 101) is a rural two-lane roadway that runs north-south in disconnected segments along the eastern border of Indiana, from Dekalb County in northern Indiana to Switzerland County in the south, approximately the entire length of the state. Because of its lack of continuity, its ability to effectively serve north-south vehicular movement in southeastern Indiana is limited. Figure 1.1 shows the SR 101 corridor study area and its major roadways.

The feasibility study is being prepared by Cambridge Systematics, Inc. with Bernardin, Lochmueller & Associates and Dyer Environmental Services under the supervision of a Management Committee comprised of staff from INDOT and the Federal Highway Administration (FHWA). Public officials, agency representatives, and the public at-large are represented through the Study Advisory Committee. Public meetings also are being conducted to obtain input from the general public. The project is being administered consistent with the guidelines of Indiana's Streamlined EIS Procedures.

Based on an assessment of the study area's transportation needs and input obtained from INDOT and the Study Advisory Committee and through interviews with community officials and business representatives, a preliminary set of alternatives was developed in October 2001 for review and comment. A series of meetings was then held with the Study Advisory Committee, the general public, and agency staff to obtain further input. Based on ideas generated at these meetings, additional preliminary alternatives were identified and described in a December 2001 memorandum. The following analysis is intended to screen these preliminary alternatives, resulting in a recommended set of alternatives which are considered most feasible for more detailed analysis.

Figure 1.1 SR 101 Study Area



2.0 Description of Preliminary Alternatives

All "build" alternatives were developed with two options – a southern segment providing connection from the southern portion of the study area to U.S. 50 and an optional northern segment which includes the southern segment but also provides a connection from U.S. 50 to I-74 at the northern edge of the study area. It should be noted that at the time of this study's initiation, the study objective was to examine the feasibility of potential connections to U.S. 50 as the northern terminus of SR 101 corridor improvements. As the study has progressed, resulting in further understanding of needs of the study area, study objectives have expanded to encompass the feasibility of a corridor with a northern terminus at I-74. Therefore, each "build" alternative has been defined with two options – a northern terminus at U.S. 50 and a northern terminus at I-74. In order to distinguish between these options, each alternative option terminating at U.S. 50 is designated as an "A" alternative; "B" alternatives *include their complementary "A" alternative* continuing to a northern connection to I-74.

The following alternatives were initially considered:

- **Alternative 1A and 1B:** A roadway between Markland Dam (east of Vevay on SR 156) and SR 129 at U.S. 50 (east of Versailles) with possible upgrade of SR 129 to I-74;

- **Alternative 2A and 2B:** A roadway between Markland Dam (east of Vevay on SR 156) and SR 101 at U.S. 50 (east of Versailles) with possible upgrade of SR 101 to I-74;

- **Alternative 3A and 3B:** A roadway between Markland Dam (east of Vevay on SR 156) to U.S. 50 east of Dillsboro with possible extension to I-74;

- **Alternative 4:** Transportation systems management (TSM) enhancements on SR 129 between SR 250 and SR 56; on SR 56 between Vevay and SR 250; and, on SR 156 between Vevay and Rising Son; and

- **Alternative 5:** Do nothing or "no build."

Following the publication and circulation of the SR 101 Draft Preliminary Alternatives Report in October 2001, meetings were held with interested parties to obtain further input into the identification of preliminary

alternatives for the SR 101 Study Area. This included meetings in November 2001 with the SR 101 Advisory Committee and the federal and state resource agencies, and a widely-publicized public information meeting in Versailles. Based on input from these meetings, additional alternatives were identified for consideration.

At the meeting of resource agencies mentioned above, multiple alternatives were submitted by U.S. Environmental Protection Agency, Region 5 for consideration. To maintain a consistent means of identification, the numbering scheme used to identify the additional alternatives maintains compatibility with the numbering of alternatives submitted by U.S. EPA staff. Based on an initial staff level screening, some of these alternatives were found to be similar to other alternatives or involve corridor alignments which are significantly longer in distance than comparable alternatives. Therefore, some of these proposed alternatives were eliminated from further consideration, resulting in gaps in the numbering sequence. A summary of these alternatives and the rationale for their elimination from further screening is attached to this memorandum as Appendix A.

The additional alternatives retained for further screening are as follow:

- **Alternative 9A and 9B:** Upgrade of SR 156 west of Vevay and SR 129 north to U.S. 421 into Versailles with possible upgrade of U.S. 421 north of Versailles to a new roadway connecting U.S. 421 with SR 229 to Batesville and I-74;

- **Alternative 11A and 11B:** A roadway between Markland Dam to SR 56/SR 250 junction with upgrade of SR 56 to Aurora; possible extension involving upgrade of SR 148 and new roadway to SR 1, connecting to I-74 in Saint Leon; and

- **Alternative 16A and 16B:** Upgrade of SR 129 from Vevay to new roadway connecting SR 129 south of Versailles to SR 129 at U.S. 50 east of Versailles; possible upgrade of SR 129 north of U.S. 50 to I-74.

The following discussion describes these alternatives in more detail. It should be emphasized that these are *approximate* corridors. In areas where a proposed alternative follows an existing road or goes through a populated area, it is assumed that route modifications will be made where possible to reduce impacts. More detailed analysis of a preferred corridor will take place during the environmental impact assessment phase of project development.

Alternative 1A – Roadway to SR 129/U.S. 50 *(Figure 2.1)*

This alternative would involve the construction of a roadway between Markland Dam at SR 156, east of Vevay, and SR 129 at U.S. 50, approximately 3.5 miles east of Versailles. The roadway would run concurrent with a portion of Bear Branch Road, north of SR 250, for approximately two miles.

Alternative 1B – Roadway to SR 129/U.S. 50 and SR 129 to I-74 *(Figure 2.1)*

This alternative would include Alternative 1A with upgrading of SR 129 north of U.S. 50 to I-74. From U.S. 50, SR 129 connects to SR 46 in Batesville, in proximity to the Batesville interchange with SR 229 on I-74 (Exit 149). Alternative 1B could include improved access to I-74 from SR 129 by either enhancing the existing access via SR 229, or by extending SR 129 to I-74, potentially requiring construction of a new or modified interchange.

Alternative 2A – Roadway to SR 101/U.S. 50 *(Figure 2.2)*

This alternative would involve the construction of a roadway between Markland Dam at SR 156, east of Vevay, and SR 101 at U.S. 50, approximately 10 miles east of Versailles. The roadway would run concurrent with a portion of Bear Branch Road, north of SR 250 at Fairview, approximately two miles.

Alternative 2B – Roadway to SR 101/U.S. 50 and SR 101 to I-74 *(Figure 2.2)*

This alternative would include Alternative 2B with upgrading of SR 101 north of U.S. 50 to I-74. From U.S. 50, SR 101 runs through Milan and Sunman, connecting to SR 46 east of Batesville and an interchange on I-74 (Exit 156) between Batesville and St. Leon. This alternative could be designed to eliminate the "jog" in SR 101 north of Milan.

Alternative 3A – Roadway to U.S. 50 (via SR 56) *(Figure 2.3)*

This alternative would involve the construction of a roadway between Markland Dam at SR 156, east of Vevay, and U.S. 50, between Dillsboro and Aurora. The roadway would run concurrent with a two-mile portion of SR 56, north of SR 250.

Alternative 3B – Roadway to U.S. 50 (via SR 56) with Continuation to I-74 *(Figure 2.3)*

This alternative would include Alternative 3A with a continuation of the roadway north of U.S. 50 to provide a continuous connection to I-74 in the vicinity of St. Leon.

Alternative 4 – TSM Enhancements *(Figure 2.4)*

This alternative will involve a range of transportation systems management (TSM) enhancements to existing roadways with the objective of eliminating potential hazards and improving roadway safety. These enhancements could include a variety of improvements such as pavement and shoulder widenings and reductions in steep grades and tight curves. Based on a review of accident statistics and traffic volumes, roadways initially identified for TSM improvements include: a) SR 129 between SR 250 and SR 56 in Vevay (SR 129 is presently programmed for reconstruction from SR 250 to SR 56, resulting in improved vertical/horizontal curves, lane widths and shoulder widths); b) SR 56 in Switzerland County; and, c) SR 156 between Vevay and Rising Sun.

Alternative 5 – No Build

This alternative would involve no changes to the existing highway network in the study area other than projects that are already programmed or committed. This alternative will provide a baseline for comparison to the other alternatives.

Alternative 9A – SR 156 to SR 129/U.S. 421 (Versailles) *(Figure 2.5)*

This alternative would involve the upgrading of two existing roadways, SR 156/SR 56, and SR 129. The alternative would include improvements to a portion of SR 156, from Markland Dam west to Vevay, where it becomes SR 56, and to the intersection with SR 129. The roadway would then run north concurrent with SR 129, connecting to U.S. 421 and U.S. 50 at Versailles. This alternative would encompass recent and future improvements programmed for SR 129 south of U.S. 50. Reconstruction of SR 129 between SR 250 and U.S. 50 has been completed and is programmed from SR 56 to SR 250 for 2003.

Alternative 9B – SR 156 to SR 129/U.S. 421/SR 229 (Batesville)/I-74 *(Figure 2.5)*

In addition to the roadway upgrades proposed in Alternative 9A, Alternative 9B includes upgrading of existing roadways and roadway construction between Versailles at U.S. 50/U.S. 421 and Batesville. The proposed corridor would run concurrent with a portion of U.S. 421, from Versailles to SR 350 at Osgood. A new roadway segment would be constructed between Osgood at the intersection of U.S. 421 and SR 350, and the SR 229/SR 48 junction. The roadway will then run concurrent with SR 229, providing a direct connection to I-74 via the existing interchange at Batesville (Exit 149). As with Alternative 9A, this alternative would encompass recent and future improvements programmed for SR 129 south of U.S. 50.

Alternative 11A – Roadway to SR 250/SR 56 (to Aurora) *(Figure 2.6)*

This alternative would involve the construction of a roadway between Markland Dam at SR 156 and East Enterprise at the SR 56/SR 250 junction. The roadway will continue north, roughly concurrent with existing SR 56 to U.S. 50 at Aurora, via a short segment of SR 350.

Alternative 11B – Roadway to SR 250/SR 56/SR 148/SR 1 (St. Leon)/I-74 *(Figure 2.6)*

In addition to the roadway construction proposed in Alternative 11A, Alternative 11B includes the upgrade of SR 148 to Kirschs Corner, where SR 148 intersects with SR 48. A new roadway would be constructed from Kirschs Corner to SR 1 in the vicinity of Guilford, and then the roadway will run concurrent with SR 1 to I-74 (Exit 164) at St. Leon. INDOT has programmed the reconstruction of SR 1 from I-74 to U.S. 50 and SR 56 from Aurora to Rising Sun. This alternative would potentially encompass these improvements.

Alternative 16A – SR 129 Connector *(Figure 2.7)*

This alternative would involve the construction of a connector between SR 129 in the vicinity of Olean and the intersection of SR 129 and U.S. 50 east of Versailles, providing greater continuity for SR 129. Similar to Alternative 9A, this alternative also would include improvements to a portion of SR 156, from Markland Dam west to Vevay where it becomes SR 56, to the intersection with SR 129. Also included would be an upgrade

of SR 129 between Vevay and Olean. This alternative would encompass recent and future improvements programmed for SR 129 south of U.S. 50. Reconstruction of SR 129 between SR 250 and U.S. 50 has been completed and is programmed from SR 56 to SR 250 for 2003.

Alternative 16B – SR 129 Connector/I-74 (*Figure 2.7)*

In addition to the roadway construction proposed in Alternative 16A, Alternative 16B includes the upgrade of SR 129 north of U.S. 50 to SR 46 at Batesville. At present, traffic from SR 129 to I-74 must take SR 46 into Batesville, and then SR 229 north in order to access I-74. Alternative 16B could include improved access to I-74 from SR 129 by either enhancing the existing access via SR 229, or by extending SR 129 to I-74, potentially requiring the construction of a new or modified interchange. As with Alternative 16A, this alternative would encompass recent and future improvements programmed for SR 129 south of U.S. 50.

Figure 2.1 Alternative 1A and 1B – Roadway to SR 129/U.S. 50

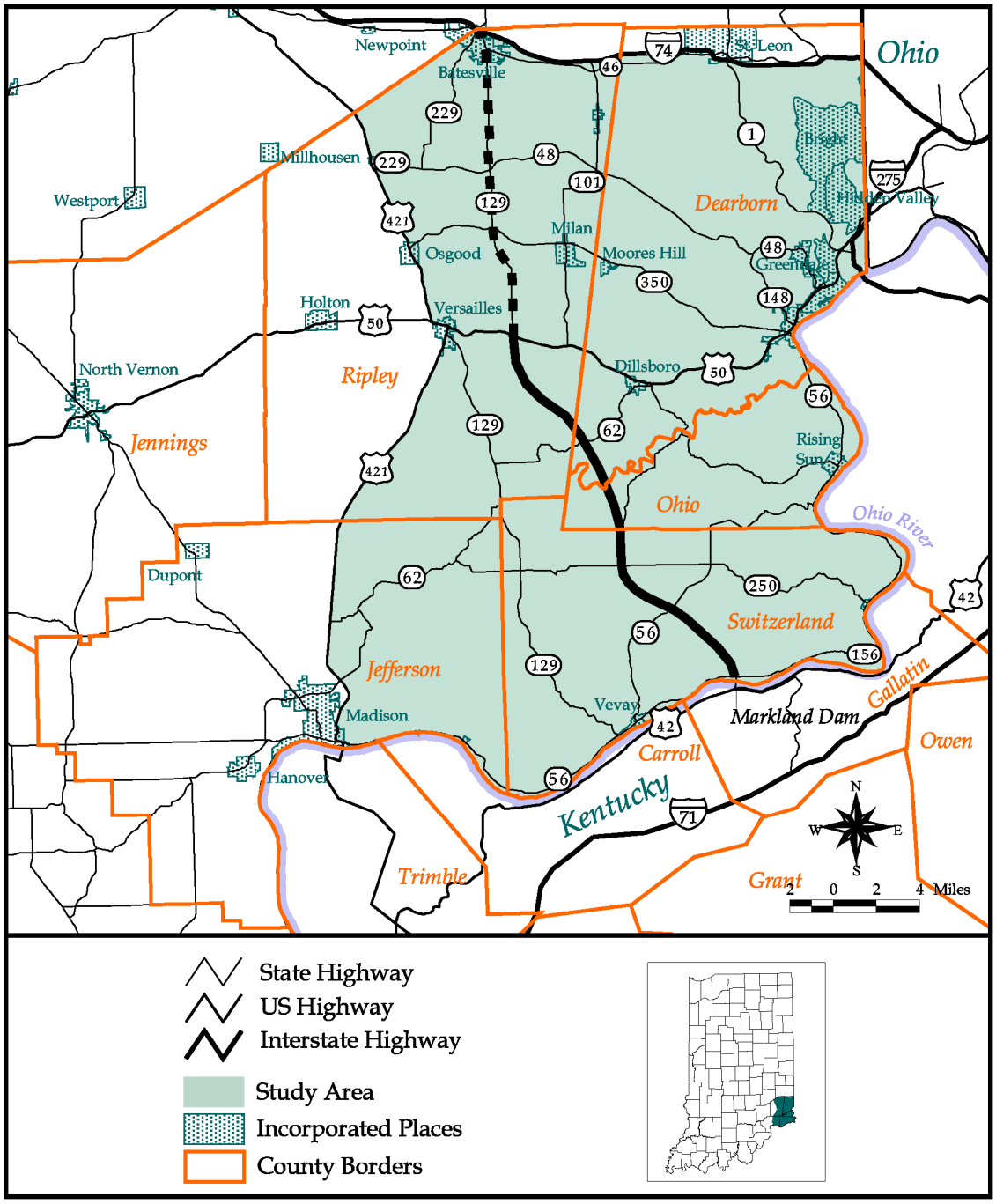


Figure 2.2 Alternative 2A and 2B – Roadway to SR 101/U.S. 50

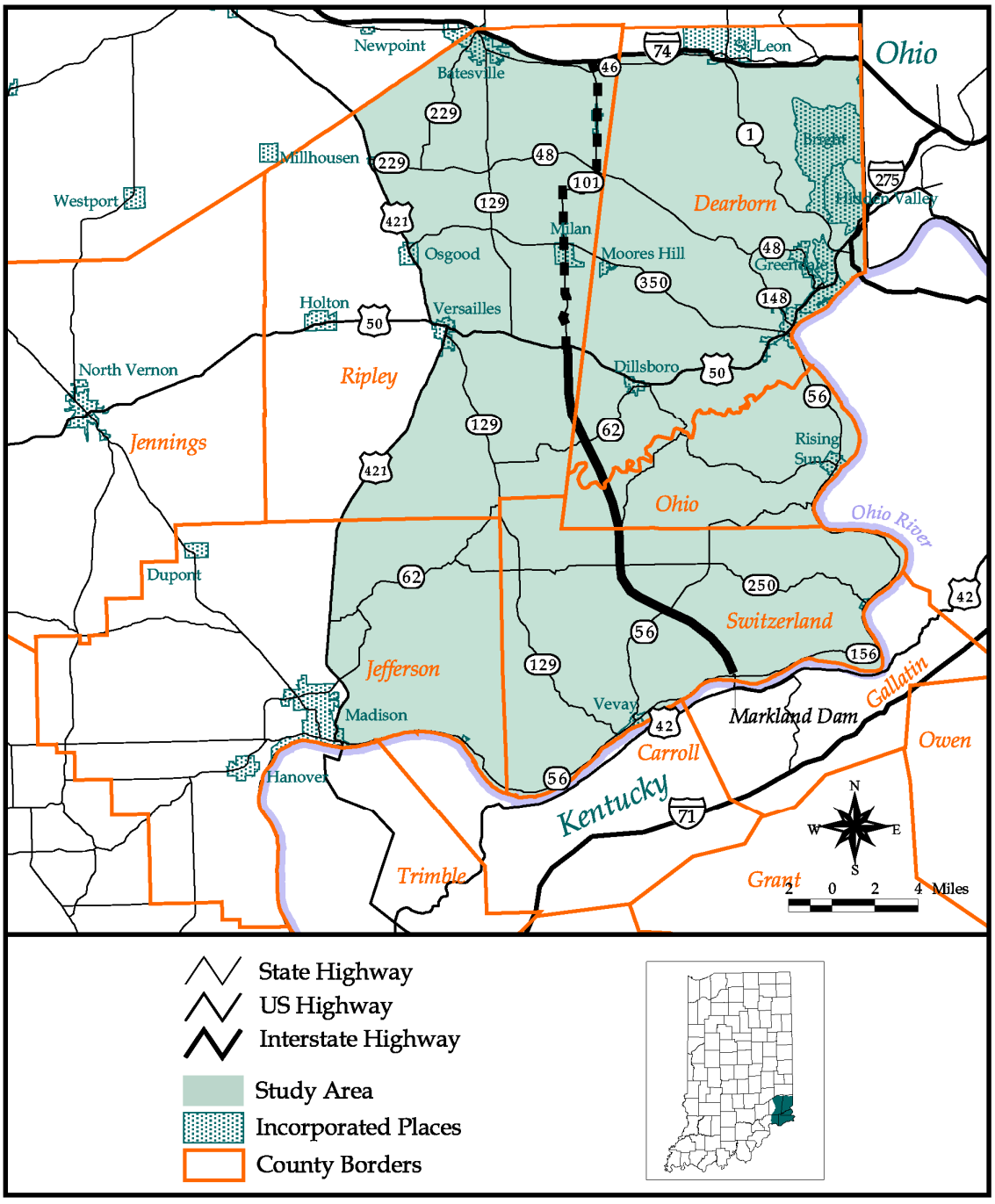


Figure 2.3 Alternative 3A and 3B – Roadway to U.S. 50 (via SR 56)

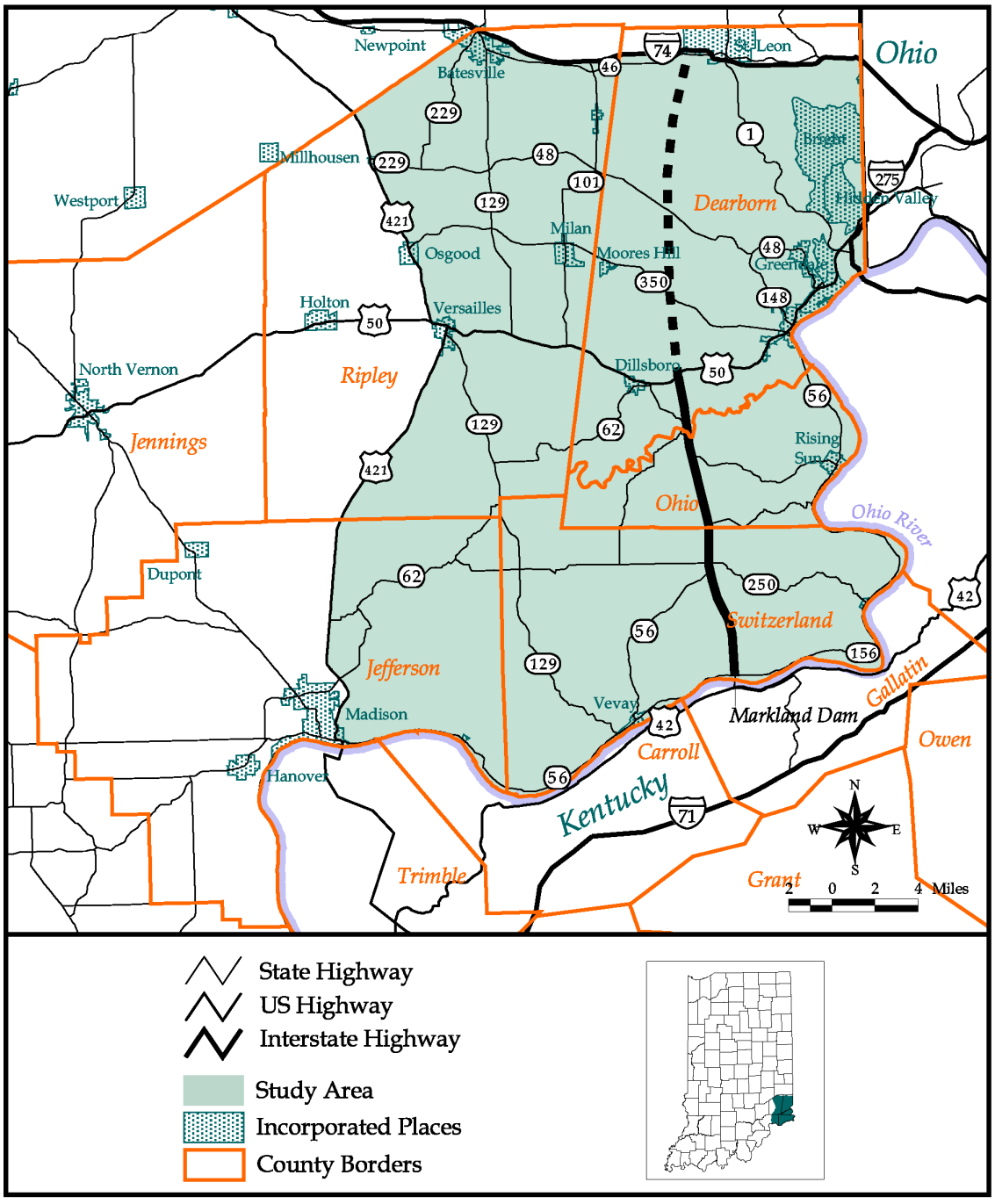


Figure 2.4 Alternative 4 – Transportation Systems Management (TSM) Enhancements

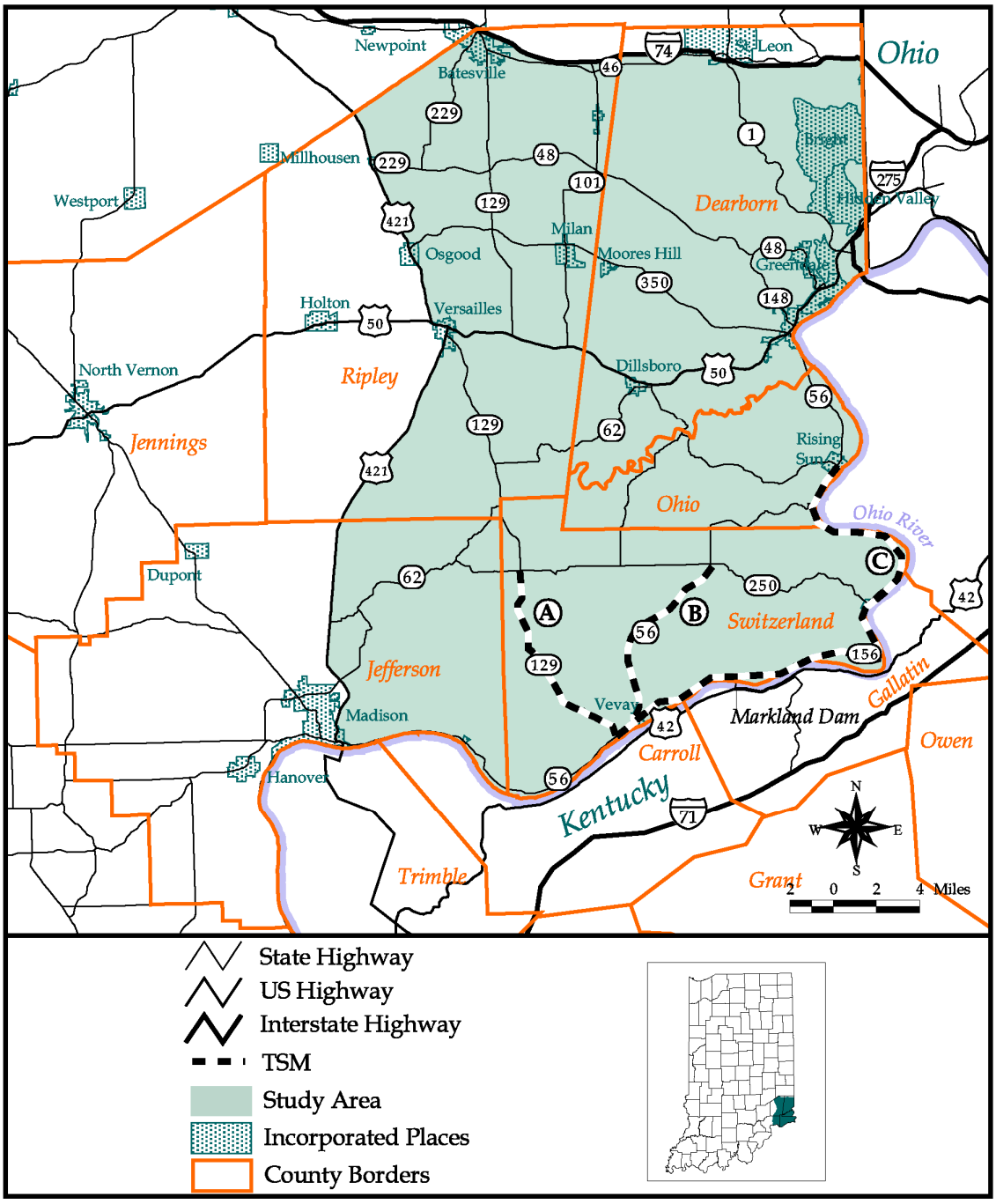


Figure 2.5 Alternative 9A and 9B – SR 156 to SR 129/U.S. 421

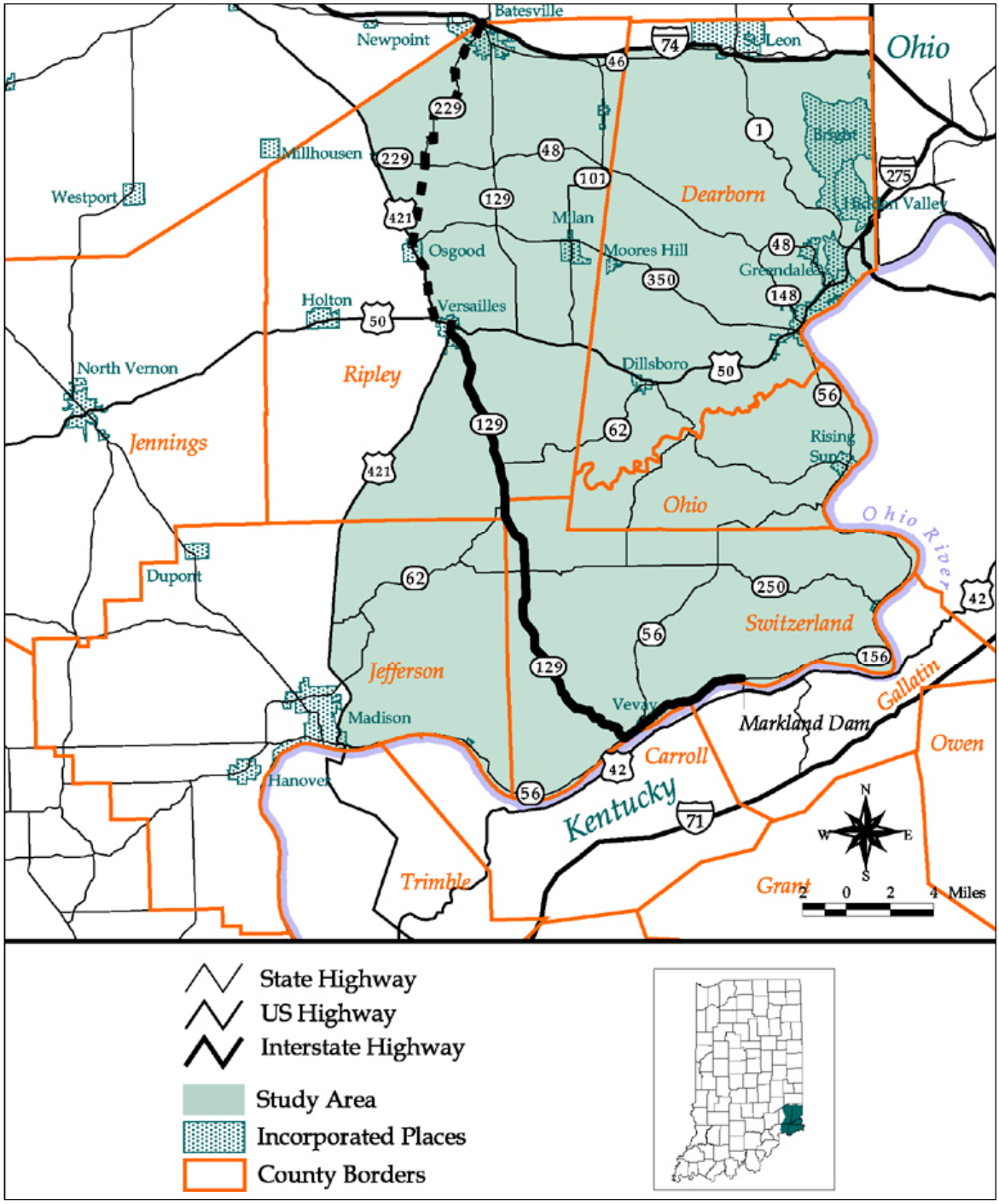


Figure 2.6 Alternative 11A and 11B – Roadway to SR 250/SR 56/ (SR 148/SR 1)

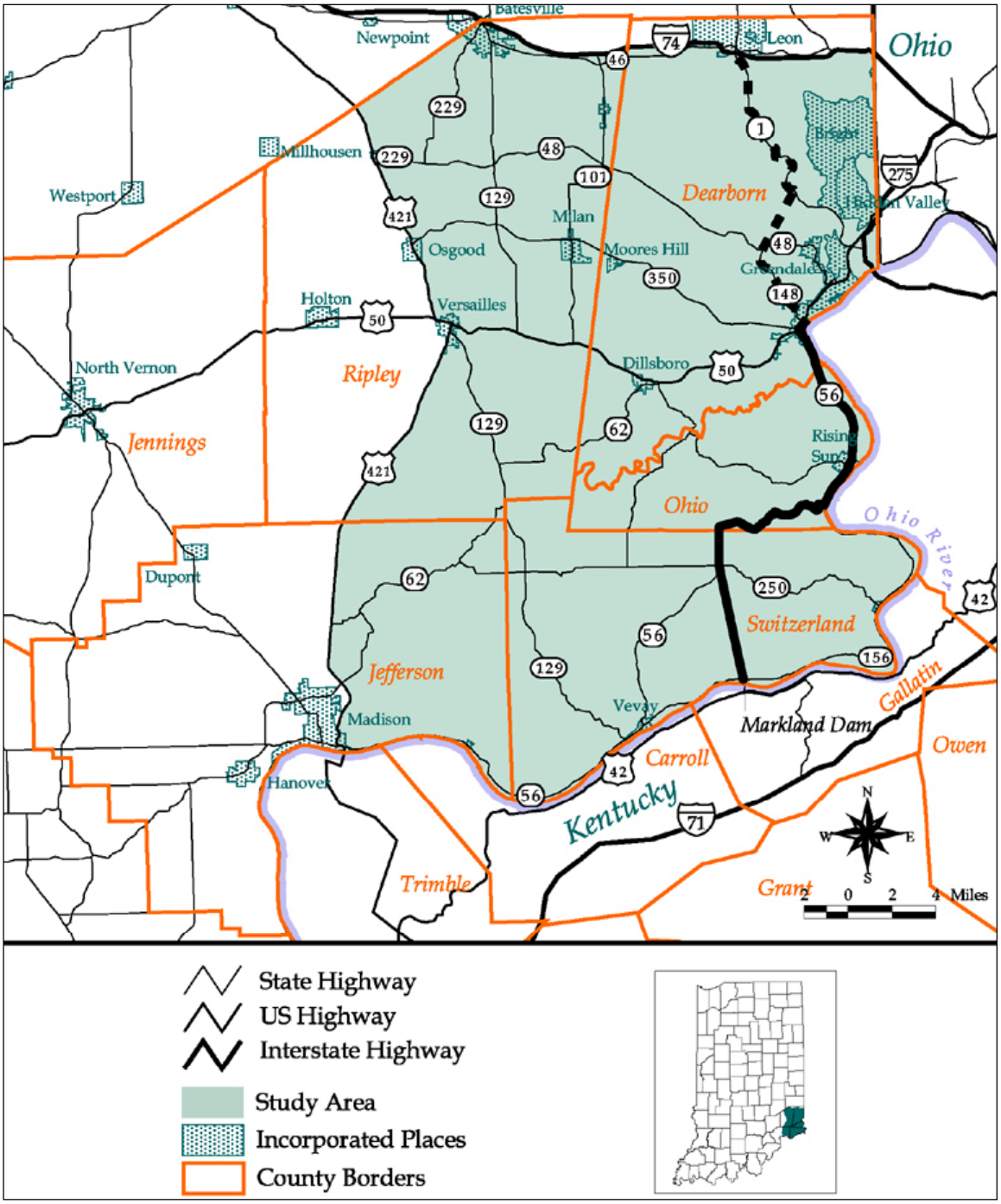
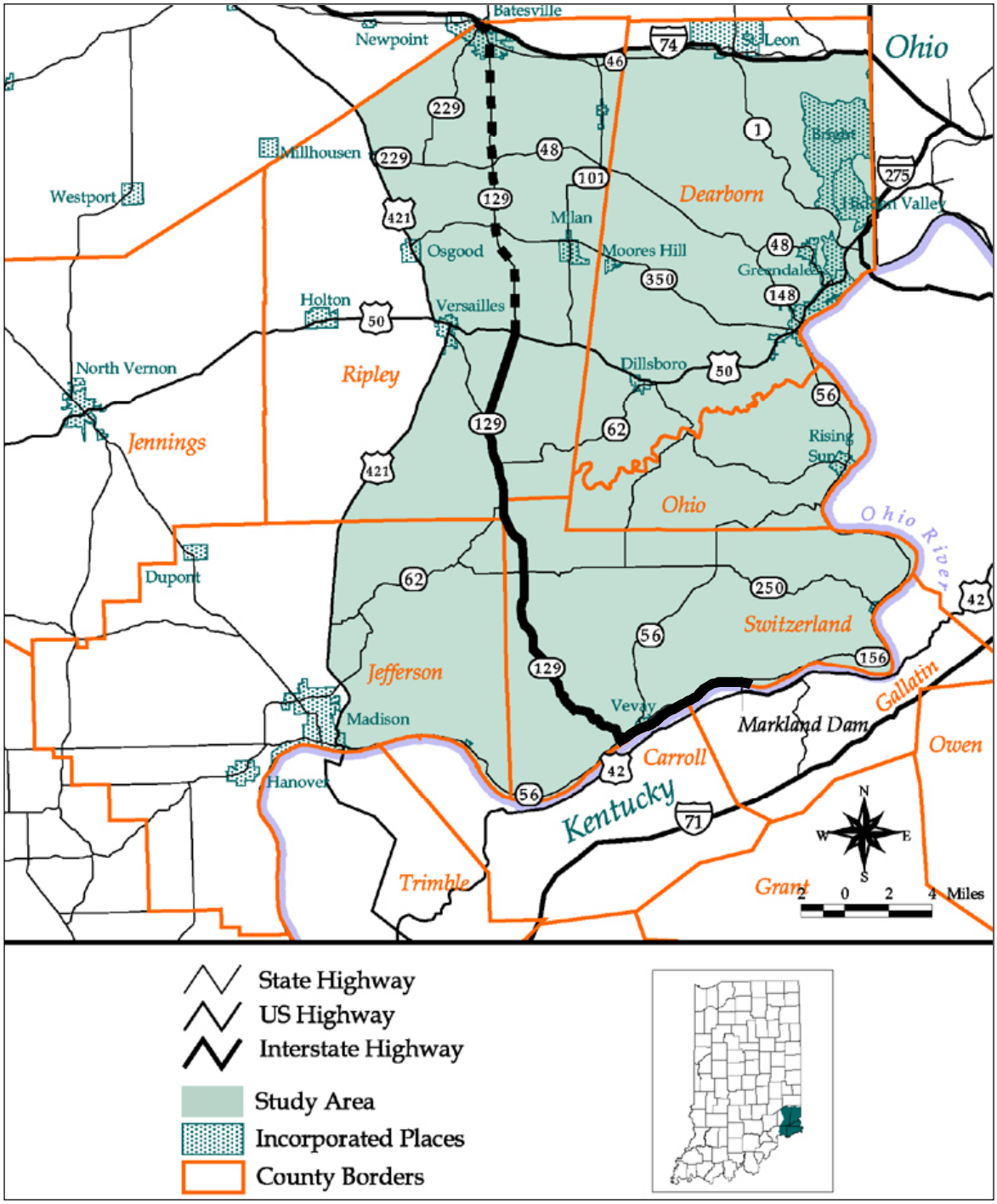


Figure 2.7 Alternative 16A and 16B – SR 129 Connector



3.0 Screening

In order to identify the most feasible of the build alternatives for detailed analysis and eliminate those which are least likely to address corridor-level transportation deficiencies, preliminary alternatives were screened based on criteria reflecting the study area's transportation needs as discussed in the January 2002 Statement of Purpose and Need. These criteria fall within the following categories:

- **Potential Safety Benefits –** Including a qualitative assessment of each alternative's potential to reduce VMT and divert traffic to improved roadways; and,

- **Access and Travel Distance –** Including distance between Markland Dam and Vevay to U.S. 50 and I-74 via most direct route available and a qualitative assessment of change in accessibility to Markland Dam and I-74

It should be noted that as a result of input received through the Study Advisory Committee and public involvement process, assessment of study area needs, and direction from INDOT, the objective of this study, previously to look at improved accessibility within the study area through improved connections to U.S. 50, has been modified to assess the feasibility of improved accessibility through improved connections to I-74. This is particularly important in addressing the criteria of Access and Travel Distance. At this stage of analysis, to not eliminate what might otherwise be a feasible alternative, the grouping of build alternatives is maintained according to their connection at their northern termini, either to U.S. 50 ("A" build alternatives) or to I-74 ("B" build alternatives). However, consistent with the objective of providing improved connectivity to I-74, alternatives were assessed as part of this screening process for their ability to provide a continuous improved connection from their southern termini and I-74 to the north. Given the possibility that a new connection to U.S. 50 (an "A" alternative) can produce benefits equivalent to a "B" alternative with respect to connectivity to I-74 but at a lower construction cost, "A" alternatives were retained for this preliminary screening.

In addition to the criteria cited above, a secondary set of screening criteria was defined to address important factors not expressly encompassed by the defined study area needs. In response to input received through the Study Advisory Committee and the public involvement process, the first of these criteria was established to identify alternatives which require a

minimal amount of new construction and maximum utilization of existing infrastructure. This criterion reflects a desire to minimize community disruption and avoid the loss of farmland. The second criterion was established for the purpose of identifying generalized environmental and community impacts, but most importantly, "fatal flaws" which would make a particular alternative infeasible. In summary these additional criteria consist of the following:

- **Length of Construction and Use of Existing Right-of-Way** – Quantification of miles of construction on new right-of-way, reconstruction of existing right-of-way, and utilization of adequate roadway; and,

- **Environmental and Community Impacts –** A preliminary assessment of communities which would potentially be impacted by new roadway construction (highly dependent upon design and choice of alignment), the number of streams and rivers which are crossed by the corridor alignment, and potential to impact parkland (specifically Versailles State Park).

3.1 Potential Safety Benefits

Table 3.1 provides a preliminary assessment of potential safety benefits resulting from each alternative. As indicated in the SR 101 Purpose and Need Statement, alleviation of roadway safety problems is a critical need in the SR 101 study area. In conducting this initial qualitative assessment of alternatives, there is an assumed relationship between travel distance and safety based on average accident rates per mile of travel – the shorter distance traveled per trip, the lower the occurrence of accidents. It also is observed in Indiana[1] that accident rates per vehicle-mile of travel on arterial roadways are lower than on collectors roadways. Therefore, greater use of arterials versus collectors is assumed to promote safer travel.

Table 3.1 assesses three variables to produce a summary assessment of overall potential to improve roadway safety within the study area. "Potential to Reduce Vehicle Miles of Travel (VMT)" is a qualitative assessment of each alternatives potential to divert trips to shorter, more direct routes compared to trips which would otherwise be restricted to the existing, "no build" roadway network. A minimal change to the existing network is assumed to result in a low potential to reduce VMT, while a substantial new addition to the roadway network, allowing for more direct

[1] See *SR 101 Corridor Improvement Feasibility Study Existing Conditions Report*, May 2001.

Table 3.1 Potential Safety Benefits

Alternative	Description	Potential to Reduce VMT	Potential to Divert Traffic to Improved Roadway	Length of Improvement to Existing Roadway (miles)	Overall Potential to Improve Safety
No Build/TSM					
4	TSM Enhancements	L	L	33.8	M
5	No Build	None	None	None	None
Build (to U.S. 50)					
1A	Roadway to SR 129/U.S. 50	M	H	2.2	M
2A	Roadway to SR 101/U.S. 50	M	H	2.2	M
3A	Roadway to U.S. 50 (via SR 56)	H	H	2.3	H
9A	SR 156 to SR 129/U.S. 421 (Versailles)	L	L	7.2	M
11A	Roadway to SR 250/SR 56 (to Aurora)	M	M	12.7	M
16A	SR 129 Connector	L	M	7.5	M
Build (to I-74)					
1B	Roadway to SR 129/U.S. 50/I-74	M	H	2.2	M
2B	Roadway to SR 101/U.S. 50/I-74	M	H	19.5	H
3B	Roadway to U.S. 50 (via SR 56)/I-74	H	H	2.3	H
9B	SR 156 to SR 129/U.S. 421/SR 229 (Batesville)/I-74	L	M	17.6	M
11B	Roadway to SR 250/SR 56/SR 148/SR 1 (St. Leon)/I-74	M	M	19.2	M
16B	SR 129 Connector/I-74	L	M	7.5	M

Note: L = Low; M = Medium; H = High.

access, particularly to the Markland Dam area, is considered to have a high potential to reduce VMT. As shown in the table, Alternatives 9A, 16A, 9B, and 16B, which follow alignments primarily along existing right-of-way are considered to have low potential to reduce VMT in comparison to the "no build" alternative. Alternatives 3A and 3B, with a relatively straight, new right-of-way to either U.S. 50 or I-74, respectively, is assumed to have high potential to reduce VMT. All other alternatives, involving a combination of existing and new right-of-way are considered to have medium potential to reduce VMT.

"Potential to Divert Traffic to Improved Roadway" is a qualitative assessment of each alternative's ability to attract traffic from other corridors to a corridor with improved or acceptable roadway characteristics. Alternative 9A is rated as having low potential to divert traffic because it does not provide any identifiable benefit over the existing network in terms of distance or travel time. Alternatives 1A, 2A, 3A, 1B, 2B, and 3B all provide a direct connection to Markland Dam and substantially shorter travel distances than comparable corridors and are therefore ranked as having high potential. All other alternatives with less direct connections to Markland Dam or lower likelihood to be perceived as a preferable route compared to an alternative route are ranked as medium.

The third column, "Length of Improvement to Existing Roadway," is the length in miles of existing roadway which would be reconstructed to a higher standard to improve efficiency and eliminate safety hazards. The greater the length of improvement, the higher the potential to improve roadway safety within the study area.

The fourth column provides a composite summary of these variables to rank the overall potential safety benefits of each alternative. Alternatives 3A, 2B, and 3B are assessed as having highest overall potential to improve travel safety within the SR 101 study area.

■ 3.2 Access and Travel Distance

Table 3.2 provides an assessment of certain access and travel distance characteristics that relate directly to the identified need for improved accessibility and connectivity in the SR 101 study area. As indicated in the study's Statement of Purpose and Need, Switzerland County falls in the bottom 20 percent of Indiana counties for accessibility to population centers (all sizes) and to urban areas (over 50,000 persons). Both Ohio and Switzerland Counties fall in the bottom 20 percent of Indiana counties for accessibility to institutions of higher learning.

Table 3.2 Access and Travel Distance

Alternative	Description	Improved Access to Markland Dam Bridge?	Improved Connection to I-74 (via adequate roadways)?	Travel Distance Via Most Direct Route From: Markland Dam to U.S. 50	Vevay to U.S. 50	Markland Dam to I-74	Vevay to I-74	Total Distance Saved[1]	Accessibility Ranking
No Build/TSM									
4	TSM Enhancements	No change	No	34.8	27.2	56.8	49.1	0.0	L
5	No Build	No change	No	34.8	27.2	56.8	49.1	0.0	L
Build (to U.S. 50)									
1A	Roadway to SR 129/U.S. 50	Direct	Yes	23.2	25.8	40.8	43.4	34.7	H
2A	Roadway to SR 101/U.S. 50	Direct	No	21.5	24.1	38.8	41.5	42.1	H
3A	Roadway to U.S. 50 (via SR 56)	Direct	No	16.9	22.0	40.0	45.0	44.0	H
9A	SR 156 to SR 129/U.S. 421 (Versailles)	Indirect	No	34.8	27.2	56.8	49.1	0.0	L
11A	Roadway to SR 250/SR 56 (to Aurora)	Direct	No	26.7	27.2	47.0	49.1	17.9	M
16A	SR 129 Connector	Indirect	Yes	33.8	26.2	51.1	43.5	13.3	M
Build (to I-74)									
1B	Roadway to SR 129/U.S. 50/I-74	Direct	Yes	23.2	25.8	40.8	43.4	34.7	H
2B	Roadway to SR 101/U.S. 50/I-74	Direct	Yes	21.5	24.1	38.8	41.5	42.1	H
3B	Roadway to U.S. 50 (via SR 56)/I-74	Direct	Yes	16.9	22.0	35.3	40.3	53.4	H
9B	SR 156 to SR 129/U.S. 421/SR 229 (Batesville)/I-74	Indirect	Yes	34.8	27.2	54.0	46.3	5.6	L
11B	Roadway to SR 250/SR 56/SR 148/SR 1 (St. Leon)/I-74	Direct	Yes	26.7	27.2	45.4	49.1	19.5	M
16B	SR 129 Connector/I-74	Indirect	Yes	33.8	26.2	51.1	43.5	13.3	M

Note: L = Low; M = Medium; H = High. Shaded areas indicate no change from No Build.

[1] Combined travel distance saved between Markland Dam/Vevay and U.S. 50/I-74, compared to "no build."

As shown in the table, three of the "build" alternatives to U.S. 50 (1A, 2A, and 3A) provide direct improved access to the Markland Dam. Although Alternatives 9A and 16A provide potentially improved access to the southern portion of the SR 101 study area, neither provides direct access to Markland Dam. Alternative 11A, by providing a new link from SR 250 to the Markland Dam, falls between these two sets of alternatives. Alternatives 1A and 16A, by connecting to SR 129 between U.S. 50 and Batesville, facilitate an improved connection to I-74 to the north, given that the portion of SR 129 north of U.S. 50 is already designated as an "adequate" roadway. SR 129 provides a reasonably direct and safe roadway between Batesville (and its I-74 interchange with SR 229) and U.S. 50. None of the other "build" alternatives to U.S. 50 provide for an improved connection to I-74 in that travel to I-74 north of U.S. 50 would require use of roadways in need of some degree of enhancement or reconstruction.

Similarly, three of the "build" alternatives to I-74 (1B, 2B, and 3B) and to a lesser extent, 11B provide direct improved access to the Markland Dam. Alternatives 9B and 16B provide potentially improved access to the southern portion of the SR 101 study area, but neither provides direct access to Markland Dam. All six of the "build" alternatives to I-74 would provide for an improved connection to I-74.

The SR 101 Advisory Committee and the general public have indicated that access to both Markland Dam and the town of Vevay is a particular problem in the SR 101 study area. The importance of an efficient connection to Markland Dam will increase with the completion of the proposed I-71/U.S. 42 Connector in Kentucky, south of Markland Dam. As a result, each alternative was screened to determine travel distance via the most direct route to both of these locations from U.S. 50 and from I-74. Distances shown for the "no build" alternative provides a basis for comparison. As indicated in Table 3.2, some of the preliminary alternatives can result in significantly shorter travel distances. Alternatives 3A and B cut the travel distance between Markland Dam and U.S. 50 to less than half the "no build" distance. Alternatives 1A/B and 2A/B also provide a significantly shorter travel distance. On the other hand, Alternative 9A provides no improvement over the "no build" and benefits resulting from Alternative 16A are minimal. From Vevay to U.S. 50 and to I-74, Alternatives 9A/B and 11A/B provide little or no improvement.

With respect to all criteria relevant to access and travel distance, the TSM alternative provides no benefit over the "no build" alternative.

3.3 Length of Construction and Use of Existing Right-of-Way

A desire to minimize land use impacts and community disruption while making the maximum possible use of existing infrastructure was expressed by both the Study Advisory Committee and by the public at-large as a consideration in the identification of SR 101 corridor alternatives. Table 3.3 provides a calculation of roadway lengths based on a rough approximation of their designated corridors. Each corridor was assessed to determine the extent of new construction which would be required on new right-of-way (ROW), the length of construction which would be required on existing ROW due to inadequacy of existing roadway, and the length of roadway which could be utilized which is considered "adequate" based on INDOT design standards. These roadways which are defined as "adequate," in most cases, have either been recently reconstructed or are programmed for reconstruction or rehabilitation in the near future.

As shown in Table 3.3, Alternative 3A is the shortest in length of the build alternatives to U.S. 50 and Alternative 9A is the longest. However, Alternative 9A would be constructed entirely on existing right-of-way and only the portion of existing SR 56 and SR 156 between Markland Dam and SR 129 would require reconstruction. Therefore, of the "build" alternatives terminating at U.S. 50, Alternative 9A requires the least amount of construction on new or existing ROW. Of the "build" alternatives to I-74, Alternative 3B is the shortest in length and Alternative 9B is the longest. However, Alternative 16B, because it is able to utilize extensive portions of SR 129, which has recently been reconstructed north of SR 250 to Versailles and between U.S. 50 and I-74, requires the least amount of new roadway construction or reconstruction of the "build" alternatives connecting to I-74.

3.4 Environmental and Community Impacts

Table 3.4 summarizes some identified screening level impacts resulting from the various alternatives. Each alternative has potential to produce a variety of environmental and community impacts. It is recognized that this summary provides only a cursory assessment of these impacts and that a more thorough assessment will be conducted at a later stage of study. However, as discussed below, impact to parkland is considered a potential "fatal" flaw which would result in the elimination of an alternative from further consideration.

"Potentially Impacted Communities" identifies the communities within a corridor designated by an alternative. No judgment is made as to whether

Table 3.3 Length of Construction and Use of Existing ROW

Alternative	Description	Length (Miles)	Length of Construction on New ROW	Length of Construction on Existing ROW	Total Length of New Construction (on New and/or Existing ROW)	Length of Adequate Existing or Committed Roadway
No Build/TSM						
4	TSM Enhancements	N/A	N/A	33.8[1]	33.8[1]	N/A
5	No Build	N/A	N/A	N/A	0.0	N/A
Build (to US-50)						
1A	Roadway to SR 129/U.S. 50	23.2	21.0	2.2	23.2	0.0
2A	Roadway to SR 101/U.S. 50	21.5	19.3	2.2	21.5	0.0
3A	Roadway to U.S. 50 (via SR 56)	16.9	14.6	2.3	16.9	0.0
9A	SR 156 to SR 129/U.S. 421 (Versailles)	34.8	0.0	7.2	7.2	27.6
11A	Roadway to SR 250/SR 56 (to Aurora)	26.7	6.4	12.7	19.1	7.6
16A	SR 129 Connector	33.7	5.2	7.5	12.7	21.0
Build (to I-74)[2]						
1B	Roadway to SR 129/U.S. 50/I-74	40.8	21.0	2.2	23.2	17.6
2B	Roadway to SR 101/U.S. 50/I-74	38.8	19.3	19.5	38.8	0.0
3B	Roadway to U.S. 50 (via SR-56)/I-74	35.3	33.0	2.3	35.3	0.0
9B	SR 156 to SR 129/U.S. 421/SR 229 (Batesville)/I-74	54.0	4.5	17.6	22.1	31.9
11B	Roadway to SR 250/SR 56/SR 148/SR 1 (St. Leon)/ I-74	45.4	10.1	19.2	29.3	16.1
16B	SR 129 Connector/I-74	51.0	5.2	7.5	12.7	38.2

[1] Depending location and extent of enhancements. Maximum length potentially requiring improvement is shown in table.

[2] All "B" Alternatives include their complementary "A" alternative southern segment.

Table 3.4 Environmental and Community Impacts

Alternative	Description	Potentially Impacted Communities	Number of River/Stream Crossings	Impact to Parkland
No Build/TSM				
4	TSM Enhancements	None	N/A	No
5	No Build	None	N/A	No
Build (to U.S. 50)				
1A	Roadway to SR 129/U.S. 50	Fairview, Bear Branch	8	Possible
2A	Roadway to SR 101/U.S. 50	Fairview, Bear Branch	9	No
3A	Roadway to U.S. 50 (via SR 56)	East Enterprise, Aberdeen, Milton	8	No
9A	SR 156 to SR 129/U.S. 421 (Versailles)	Vevay, Versailles	11	Possible
11A	Roadway to SR 250/SR 56 (to Aurora)	East Enterprise, Aberdeen, Rising Sun	7	No
16A	SR 129 Connector	Vevay, Elrod	9	Possible
Build (to I-74)				
1B	Roadway to SR 129/U.S. 50/I-74	Fairview, Bear Branch, Elrod, Delaware, Batesville	11	Possible
2B	Roadway to SR 101/U.S. 50/I-74	Fairview, Bear Branch, Milan, Sunman	10	No
3B	Roadway to U.S. 50 (via SR 56)/I-74	East Enterprise, Aberdeen, Milton, St. Leon	16	No
9B	SR 156 to SR 129/U.S. 421/SR 229 (Batesville)/I-74	Vevay, Versailles, Osgood, Ballstown, Batesville	16	Possible
11B	Roadway to SR 250/SR 56/SR 148/SR 1 (St. Leon)/I-74	East Enterprise, Aberdeen, Rising Sun, Aurora, Lawrenceville, Guilford, St. Leon	11	No
16B	SR 129 Connector/I-74	Vevay, Elrod, Delaware, Batesville	12	Possible

the impacts to a given community are negative or positive, only that the corridor designated for the alternative passes through that community. Actual impacts are a function of roadway alignment, availability of right-of-way, design, and means of access within the designated corridor.

The number of river and stream crossings is based on a GIS (Geographic Information System) assessment of each corridor, using the ESRI ArcView database of Rivers and Streams in the Eastern United States. This inventory is intended to provide an estimate of how many bridge structures may potentially be required to construct a given alternative. It does not take into account structures which may already be in place which could be adapted to accommodate an alternative. Laughery Creek is largest river or stream in the study area, and would need to be crossed by all alternatives, with the exception of Alternative 9A.[2]

Versailles State Park on either side of U.S. 50, north and east of the town of Versailles, represents a significant parkland resource within the study area. The assessment of potential impacts to parkland identifies those alternatives where the designated corridor is within or in the vicinity of the State Park. In the event that a given alternative as currently defined would pass through Versailles State Park, thereby falling under the provisions of federal Section 4f regulations,[3] this would be considered a fatal flaw, and result in the elimination of this alternative from further consideration. Although none of the alternative corridors as currently defined would travel through the state park, some of the corridors are in the vicinity of the state park and are therefore designated as having "Possible" impacts. As discussed above, actual impacts are a function of roadway alignment, availability of right-of-way, design, and means of access and may be potentially avoided entirely. Therefore, designation as having "Possible" impacts on parkland is not considered a fatal flaw at this stage of analysis. As a result, none of the preliminary "build" alternatives were eliminated from further consideration as a result of the "fatal flaw" review.

[2] INDOT's Engineering Assessment Section has noted that as alternatives follow more easterly corridor alignments, closer to the Ohio River, the size and flow of streams flowing into the Ohio River increase. This higher flow rate potentially requires longer and more expensive bridges to accommodate a crossing.

[3] Section 4f of the 1966 Department of Transportation Act prohibits the use of publicly owned parks, recreation areas, wildlife areas, and historic sites of national, state, or local importance from being used in transportation projects unless the Secretary of Transportation determines there are "no feasible and prudent alternatives."

4.0 Evaluation of Alternatives and Recommendations for Detailed Analysis

4.1 Evaluation of Alternatives

The following is intended to summarize key attributes of the preliminary alternatives based on the screening performed in the preceding section.

No Build Alternative

The "no build" alternative provides no benefits in terms of improved access and/or travel distance and no benefits in terms of potential to improve roadway safety. However, it provides a baseline for the evaluation of benefits resulting from the build alternatives.

TSM Alternative

Because this alternative would involve only reconstruction of existing roadways for the purpose of eliminating safety hazards, it would provide no benefits in terms of improved access and/or travel distance, a primary goal identified for the study area. Preliminary assessment of improvements which would need to be addressed through this alternative also indicates that this could be a higher cost alternative than other "build" alternatives due to the likely need to reconstruct substantial portions of SR 56 and SR 156 rather than "spot" improvements in limited areas.

Build Alternatives to U.S. 50 ("A" Alternatives)

- **Alternative 1A –** This alternative is in the high range for reduced travel distance between key locations and provides a direct connection to Markland Dam. It is in the medium range for safety benefits because its overall potential to reduce VMT may be limited due to the availability of a competing corridor (SR 129) to the west.

- **Alternative 2A –** This alternative is in the high range for reduced travel distance between key locations and provides a direct connection to Markland Dam. It is in the medium range for safety benefits because its overall potential to reduce VMT may be limited due to the availability of a competing corridor (SR 129) to the west. This alternative provides the best connection from Markland Dam/Vevay to I-74 (of the alternatives terminating at U.S. 50) and the second best in connection to U.S. 50.

- **Alternative 3A –** This alternative is in the high range for reduced travel distance between key locations; also provides a direct connection to Markland Dam. It provides the best connection from Markland Dam/Vevay to U.S. 50; second best in connection from Markland Dam to I-74 (but fourth from Vevay to I-74). Also, it is in the high range for safety benefits due to potential to reduce VMT and to divert traffic to an improved roadway.

- **Alternative 9A –** Although this alternative requires the least amount of new construction of all alternatives terminating at U.S. 50 and therefore involves the greatest utilization of existing infrastructure, it provides no benefit in reduced travel distance between key locations and only an indirect connection to Markland Dam. It follows existing right-of-way, thereby providing little benefit relative to reduced VMT or traffic diversion. It would encompass benefits from recent and committed improvements to SR 129 south of U.S. 50. Also, some safety improvements would result from improvements to SR 156.

- **Alternative 11A –** This alternative would provide a direct connection to Markland Dam via a new roadway from SR 56, but the majority of construction would be on existing right-of-way. This alternative can provide some reduction in VMT and potential to divert traffic to an improved roadway but the majority of the alignment follows existing SR 56, limiting the overall reduction in travel distance between key locations. The reconstruction of SR 56 from Aurora to Rising Sun is already a committed improvement. As a result, there is small or no benefit in terms of travel distance over "no build."

- **Alternative 16A –** This alternative provides a small benefit in reduced travel distance between key locations and only an indirect connection to Markland Dam. It primarily follows existing right-of-way except for the new segment south of U.S. 50 which provides greater continuity for SR 129. Therefore, this alternative appears to provide little benefit relative to reduced VMT or traffic diversion. However, of the alternatives terminating at U.S. 50 which also provide improved accessibility between key locations in the study area, this alternative involves the least amount of new construction on either new ROW or existing ROW and the greatest utilization of "adequate" roadway. It also provides a

bypass for north-south traffic around the town of Versailles which may benefit from improved traffic operations. This alternative would encompass benefits from recent and committed improvements to SR 129 south of U.S. 50. Also, some safety improvements would result from improvements to SR 156.

Build Alternatives to I-74 ("B" Alternatives)

- **Alternative 1B –** This alternative is in the high range for reduced travel distance between key locations and provides a direct connection to Markland Dam. It is in the medium range for safety benefits because its overall potential to reduce VMT may be limited due to the availability of a competing corridor (U.S. 421 and SR 129) to the west.

- **Alternative 2B –** This alternative is in the high range for reduced travel distance between key locations and provides a direct connection to Markland Dam. It is in the medium range for safety benefits because its overall potential to reduce VMT may be limited due to the availability of a competing corridor (U.S. 421 and SR 129) to the west. It provides the best connection from Markland Dam/Vevay to I-74 (of the alternatives terminating at U.S. 50) and the second best in connection to U.S. 50.

- **Alternative 3B –** This alternative is in the high range for reduced travel distance between key locations; it also provides a direct connection to Markland Dam. It provides the best connection from Markland Dam/Vevay to U.S. 50 and Vevay to I-74; second best in connection from Markland Dam to I-74. It is also in high range for safety benefits due to potential to reduce VMT and to divert traffic to an improved roadway.

- **Alternative 9B –** This alternative provides no benefit in reduced travel distance between key locations and only an indirect connection to Markland Dam. It follows existing right-of-way, thereby providing little benefit relative to reduced VMT or traffic diversion. North-south traffic utilizing this alternative would need to travel through the town center of Versailles. This alternative would encompass benefits from recent and committed improvements to SR 129 south of U.S. 50. Also, some safety improvements would result from improvements to SR 156.

- **Alternative 11B –** This alternative would provide a direct connection to Markland Dam via a new roadway from SR 56, but the majority of construction would be on existing right-of-way. This alternative can provide some reduction in VMT and potential to divert traffic to an improved roadway but the majority of the alignment follows existing SR 56 and SR 1, limiting the overall reduction in travel distance

between key locations. The reconstruction of SR 56 from Aurora to Rising Sun and SR 1 from I-74 to Lawrenceburg are already committed projects. As a result, there is small or no benefit in terms of travel distance over "no build."

- **Alternative 16B –** This alternative provides a small benefit in reduced travel distance between key locations and only an indirect connection to Markland Dam. It primarily follows existing right-of-way except for the new segment south of U.S. 50, providing greater continuity for SR 129. Therefore, this alternative appears to provide little benefit relative to reduced VMT or traffic diversion. However, this alternative involves the least amount of new construction on either new ROW or existing ROW and the greatest utilization of "adequate" roadway of all alternatives terminating at I-74 at the northern edge of the study area. It also provides a bypass for north-south traffic around the town of Versailles which may benefit from improved traffic operations. This alternative would encompass benefits from recent and committed improvements to SR 129 south of U.S. 50. Also, some safety improvements would result from improvements to SR 156.

■ 4.2 Some Summary Conclusions

Table 4.1 provides a summary of the ranking of each alternative according to the preliminary screening criteria of safety, accessibility, new roadway construction, and parkland impacts.

Some further observations:

- The TSM alternative may address the identified goal of improved travel safety but it does not address the goal of improved regional accessibility and connectivity. TSM enhancements could potentially be incorporated as spot improvements into other build alternatives which address the goal of improved regional accessibility and connectivity to enhance overall roadway safety.

- Alternatives 9A/9B and 11A/11B provide little or no improvement in accessibility between key locations in the study area.

- It is not intuitively apparent that Alternative 9B, and 16 A/B would draw significant traffic from I-74. Traffic oriented to/from Indianapolis would have more direct southerly access via U.S. 421. Traffic oriented to/from Ohio and Cincinnati would be able to utilize either U.S. 50 to Dillsboro or SR 56 from Lawrenceburg. However, both Alternatives 9B and 16 A/B provide improved continuity to the study area's existing road network.

Table 4.1 Summary Evaluation

Alternative	Description	Safety Ranking	Accessibility Ranking	Length of New Construction (miles)	Impact to Parkland
No Build/TSM					
4	TSM Enhancements	M	L	33.8	No
5	No Build	None	L	0.0	No
Build (to U.S. 50)					
1A	Roadway to SR 129/U.S. 50	M	H	23.2	Possible
2A	Roadway to SR 101/U.S. 50	M	H	21.5	No
3A	Roadway to U.S. 50 (via SR 56)	H	H	16.9	No
9A	SR 156 to SR 129/U.S. 421 (Versailles)	M	L	7.2	Possible
11A	Roadway to SR 250/SR 56 (to Aurora)	M	M	19.1	No
16A	SR 129 Connector	M	M	12.7	Possible
Build (to I-74)[2]					
1B	Roadway to SR 129/U.S. 50/I-74	M	H	23.2	Possible
2B	Roadway to SR 101/U.S. 50/I-74	H	H	38.8	No
3B	Roadway to U.S. 50 (via SR 56)/I-74	H	H	35.3	No
9B	SR 156 to SR 129/U.S. 421/SR 229 (Batesville)/I-74	M	L	22.1	Possible
11B	Roadway to SR 250/SR 56/SR 148/SR 1 (St. Leon)/ I-74	M	M	29.3	No
16B	SR 129 Connector/I-74	M	M	12.7	Possible

Note: L = Low; M = Medium; H = High.

- Alternatives 1B and 2B follow parallel corridors, however Alternative 2B provides a more direct, shorter connection to I-74.

4.3 Recommendations for Detailed Analysis

Based on the screening in the preceding section and the evaluation discussed above, it is recommended that the SR 101 Corridor Improvement Feasibility Study adopt the following alternatives for detailed analysis:

- **No Build –** This alternative is required for conventional alternatives analysis. It provides a baseline for comparison of impacts resulting from build alternatives.

- **Alternative 2B –** This alternative ranks high in terms of improved accessibility between key locations in the study area as well as potential safety benefits. It would result in substantial improvement to existing roadway (SR 101 north of U.S. 50) while taking advantage of an existing interchange on I-74 with direct access to the existing SR 101 corridor.

- **Alternative 3B –** This alternative ranks highest in terms of improved accessibility between key locations in the study area and also ranks high for potential safety benefits. It would require development of a new right-of-way north of U.S. 50, rather than adaptation of an existing right-of-way. It also would provide for a new interchange on I-74.

- **Alternatives 16B –** This alternatives requires the least amount of new construction either on new ROW or reconstruction of existing ROW of all alternatives providing an improved connection to I-74 at the northern edge of the study area. Although it appears to provide limited potential for improved accessibility, this alternative provides a potentially less disruptive opportunity to improve continuity while making maximum use of the existing highway network of the study area. It also provides a bypass for north-south traffic around the town center of Versailles which may benefit from improved traffic operations.

Appendix A

Additional Alternatives Submitted by EPA Region 5

Additional Alternatives Submitted by EPA Region 5

Alternative 6/EPA – New roadway from Markland Dam to existing SR 129 north of SR 250. Follow SR 129 until approximately two miles north of border between Ripley and Switzerland Counties, then new roadway connecting to SR 129 at U.S. 50 east of Versailles. Follow ROW of SR 129 to I-74 in Batesville.

- ***Rational for Elimination –*** Closely follows designated corridor of Alternative 1, although longer in overall distance in order to make use of limited portion of existing SR 129. Provides no accessibility benefit over comparable Alternative 1.

Alternative 7/EPA – New roadway from Markland Dam to Bear Branch Road at SR 250. Follow Bear Branch Road to intersection with SR 262 southeast of Dillsboro; follow SR 262 to U.S. 50 in Dillsboro, then west along U.S. 50 to SR 129 at U.S. 50 east of Versailles. Follow ROW of SR 129 to I-74 in Batesville.

- ***Rational for Elimination –*** Circuitous routing from Batesville to Markland Dam with no benefit in accessibility over existing routes. Would also require substantial widening of the entire length of the narrow Bear Branch Road right-of-way.

Alternative 8/EPA – New roadway from Markland Dam to Bear Branch Road at SR 250. Follow Bear Branch Road to intersection with SR 262 southeast of Dillsboro; follow SR 262 to U.S. 50 in Dillsboro, then west along U.S. 50 to intersection with U.S. 421 in Versailles. Follow U.S. 421 to Osgood, then new roadway from U.S. 421 to SR 229 to I-74 in Batesville.

- ***Rational for Elimination –*** Circuitous routing from Batesville to Markland Dam with no benefit in accessibility over existing routes. Would also require substantial widening of the entire length of the narrow Bear Branch Road right-of-way.

Alternative 10/EPA – SR 156 from Markland Dam to SR 129 west of Vevay; follow SR 129 to Versailles, then east on U.S. 50 to SR 129 north to I-74 in Batesville.

- ***Rational for Elimination –*** Utilizes all existing right-of-way; no accessibility benefit over existing routes.

Alternative 12/EPA – SR 156 from Markland Dam to SR 56 in Vevay; follow SR 56 north about three miles to a new roadway from SR 56 to intersection of SR 250 and Bear Branch Road. Follow Bear Branch Road to intersection with SR 262 southeast of Dillsboro; follow SR 262 to U.S. 50 in Dillsboro, then west along U.S. 50 to intersection with SR 101. Follow SR 101 north to I-74.

- ***Rational for Elimination –*** Similar, although less direct, than corridor designated in Alternative 2. Would provide no accessibility advantage over Alternative 2. Would also require substantial widening of the entire length of the narrow Bear Branch Road right-of-way.

Alternative 13/EPA – SR 156 from Markland Dam to SR 129 west of Vevay; follow SR 129 until approximately three miles north of border between Ripley and Switzerland Counties, then new roadway connecting to SR 101 at U.S. 50. Follow ROW of SR 101 to I-74.

- ***Rational for Elimination –*** Similar to Alternative 16, although it would require a longer connecting roadway from SR 129 to intersection of U.S. 50 at SR 101. Provides no accessibility advantage over Alternative 16. Would also involve potential right-of-way issues in Milan.

Alternative 14/EPA – New roadway from Markland Dam to Bear Branch Road at SR 250. Follow Bear Branch Road to intersection with SR 262 southeast of Dillsboro; new roadway from SR 262 to U.S. 50 east of Dillsboro. Follow U.S. 50 to Lawrenceburg, then SR 1 to I-74 in St. Leon.

- ***Rational for Elimination –*** Similar to Alternative 11, although more circuitous with no accessibility advantage. Would also require substantial widening of the entire length of the narrow Bear Branch Road right-of-way.

Alternative 15/EPA – New roadway from Markland Dam to Bear Branch Road at SR 250. Follow Bear Branch Road to intersection with SR 262 southeast of Dillsboro; new roadway from SR 262 to U.S. 50 east of Dillsboro. Follow U.S. 50 to Aurora, then SR 148 to SR 48; then new roadway from SR 48 to SR 1 to I-74 in St. Leon.

- ***Rational for Elimination –*** Similar to, although more circuitous than, Alternative 11 with no accessibility advantage. Would also require substantial widening of narrow Bear Branch Road right-of-way.